



Frailty, a complex phenomenon

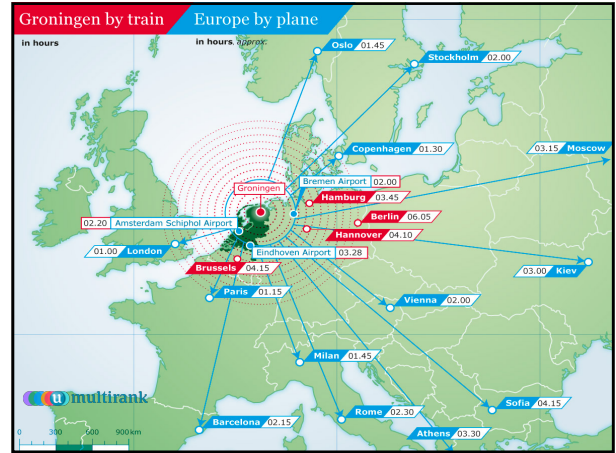
Dr. Hans Hobbelen
 professor in Healthy Lifestyle, Ageing and health Care and
 Vice President IPTOP
 Researchgroup Healthy Ageing Allied Health Care and Nursing

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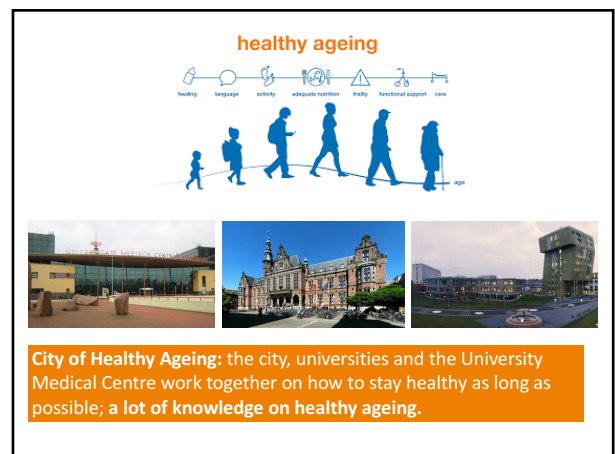
Healthy Ageing

Hanze University of Applied Sciences
 Groningen

IPTOP
 International Association
 of Translational
 Occupational
 Physiology




Capital of the North with 200,000 residents
 Youngest city in the Netherlands, 50 % of population
 Under 35
 Happiest city in the Netherlands Highest ranking for
 Quality of life.
 > 55.000 (international) students
 Student city, 1 in 5 inhabitants is a student, highest
 percentage of any city in the Netherlands.



healthy ageing

health language activity adequate nutrition frailty functional support care

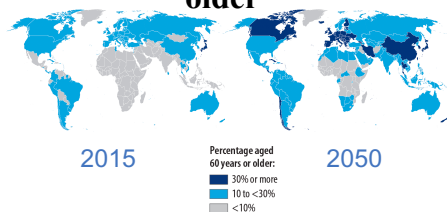
City of Healthy Ageing: the city, universities and the University
 Medical Centre work together on how to stay healthy as long as
 possible; a lot of knowledge on healthy ageing.

An Ageing Society



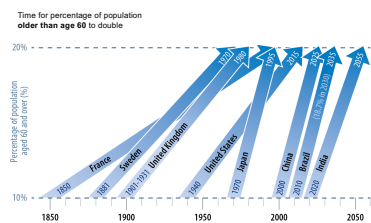
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Populations are getting older



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Population ageing is happening much more quickly than in the past



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Increased life expectancy

Christensen et al 2009

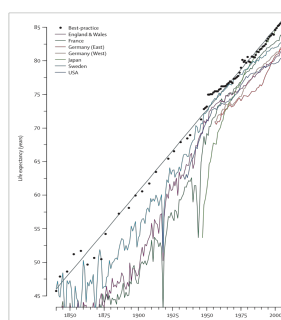


Figure 2: Best practice life expectancy and life expectancy for women in selected countries from 1860 to 2007. Linear regression trend depicted by solid grey line with a slope of 0.24 per year. Data from share your talent. move the world. of infectious 2.2 and the Human Mortality Database.

There is no “typical” older person

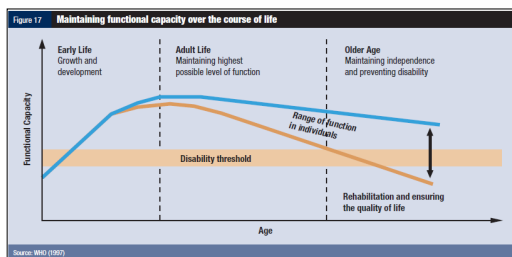


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The goal:
maximize
functional
ability



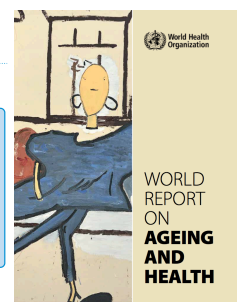
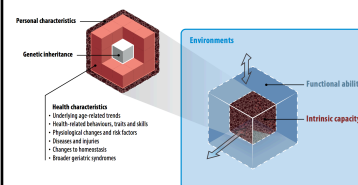
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Intrinsic Capacity

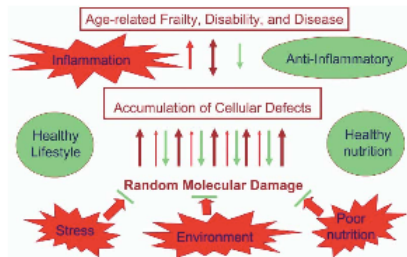
Fig. 2.1. Healthy Ageing



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The ageing process

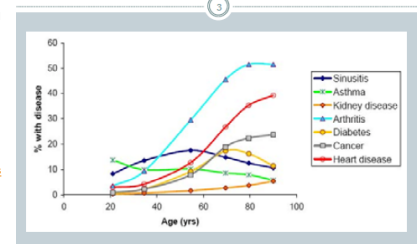
Kirkwood Cell 2005



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Age-related diseases in people

Prevalence of selected chronic conditions, expressed in percentages, as a function of age for the US population (2002-2003 dataset). All forms of cancer and heart disease are featured.
Source: CDC/NCHS, National Vital Statistics System, Mortality Data.

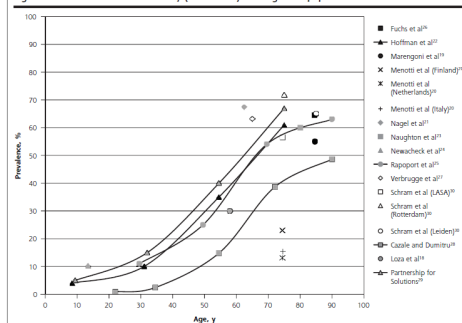


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Prevalence multimorbidity

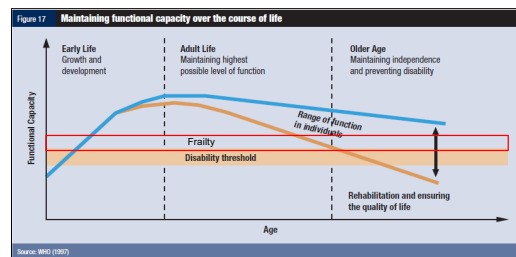
Fortin et al 2012

Figure 4. Prevalence of multimorbidity (>2 diseases) in the general population.



LASA = Longitudinal Aging Study Amsterdam.
Note: Data reported in the studies were adjusted to fit into the graph, as described in the Methods section.

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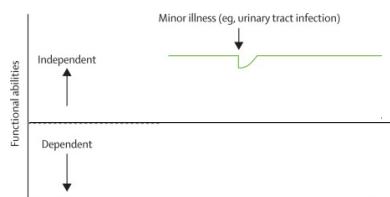
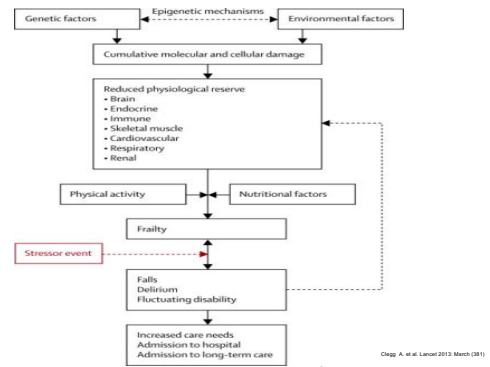
Frailty:

Fried et al 2001

- frailty is a biologic syndrome of decreased reserve and resistance to stressors, resulting from cumulative declines across multiple physiologic systems, and causing vulnerability to adverse outcomes including falls, incident disability, hospitalization, and mortality.

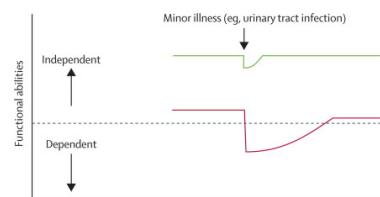
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Proposed mechanism



Clegg A, et al. The Lancet 2013; 381: 752-762

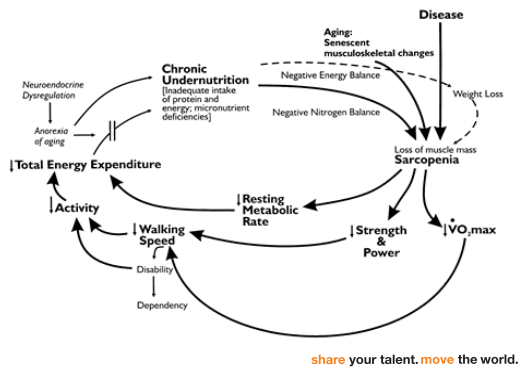
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Clegg A, et al. The Lancet 2013; 381: 752-762

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Fried et al 2001 'biological syndrome'



Accumulation of deficits Rockwood K et al., Can Med Assoc J 2005;173(5):489-95. 'Risk Factor Approach'

Appendix 1: List of variables used by the Canadian Study of Health and Aging to construct the 70-item CSHA Frailty Index

<ul style="list-style-type: none"> Changes in everyday activities Head and neck problems Poor muscle tone in neck Bradykinesia, facial Problems getting dressed Problems with bathing Problems carrying out personal grooming Urinary incontinence Toileting problems Bulk difficulties Rectal problems Gastrointestinal problems Problems cooking Sickness problems Problems going out alone Impaired mobility Musculoskeletal problems Bradykinesia of the limbs Poor muscle tone in limbs Poor limb coordination Poor coordination, trunk Poor standing posture Irregular gait pattern Falls 	<ul style="list-style-type: none"> Feeling sad, blue, depressed History of depressed mood Tiredness all the time Depression (clinical impression) Sleep changes Resonance Memory changes Short-term memory impairment Long-term memory impairment Changes in general mental functioning Onset of cognitive symptoms Cholinergic deficits History relevant to cognitive impairment Family history relevant to cognitive impairment or loss Impaired vibration Finger at rest Postural tremor Intention tremor History of Parkinson's disease Family history of degenerative disease 	<ul style="list-style-type: none"> Seizures, partial complex Seizures, generalized Syncope or blackouts Headache Cardiovascular problems History of stroke History of diabetes mellitus Arterial hypertension Peripheral pulses Cardiac problems Myocardial infarction Arrhythmias Congestive heart failure Lung problems Respiratory problems History of thyroid disease Thyroid problems Skin problems Malignant disease Breast problems Abdominal problems Presence of snout reflex Presence of the palmonental reflex Other medical history
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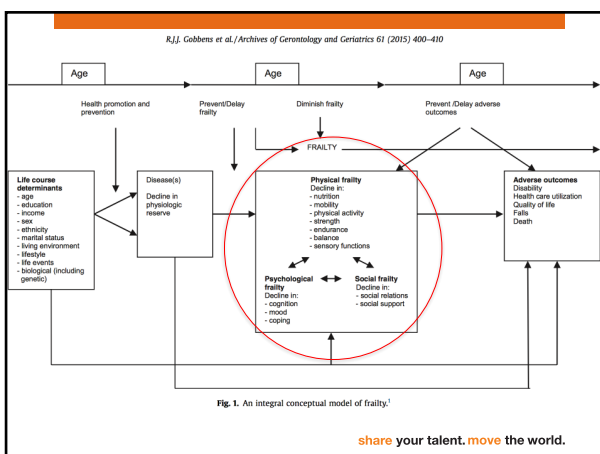
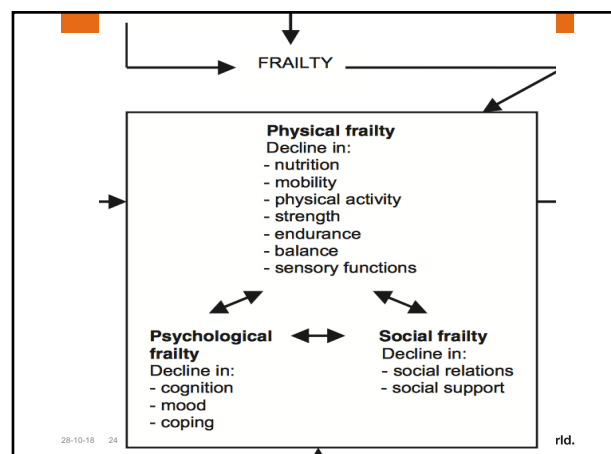
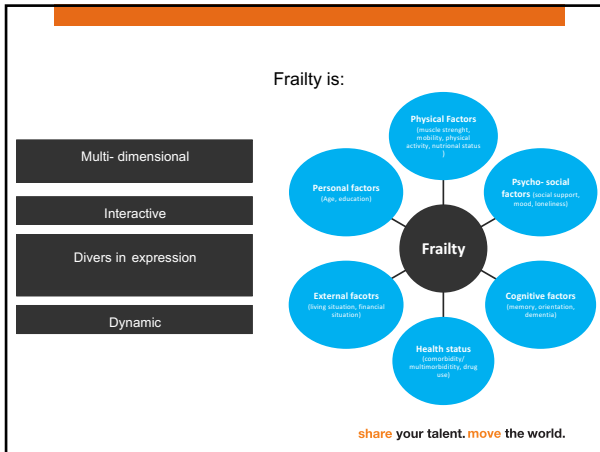


Fig. 1. An integral conceptual model of frailty.¹





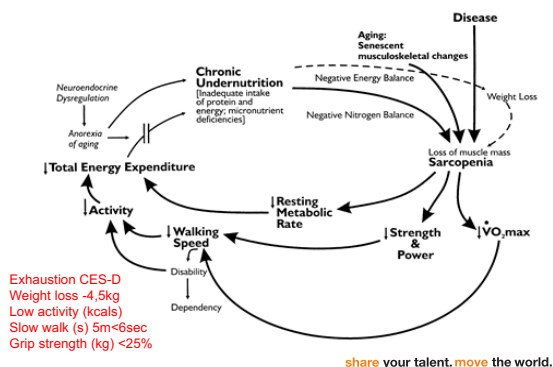
Outcome instruments to measure frailty

De Vries et al. Outcome instruments to measure frailty: a systematic review, 2011

- In total 20 frailty instruments retrieved
- Large differences in prevalence; 5%-55%
- Limited research on clinimetric properties
- Mainly developed as prognostic instrument
- Roberta Vella Azzopardi et al. 2016 → Linking Frailty Instruments to the International Classification of Functioning, Disability, and Health: A Systematic Review
- 79 original or adapted instruments → Environmental and personal factors should be given more thought in future frailty assessments.

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Fried et al 2001 "Phenotype Method"



Frailty Index (Rockwood et al) "Index method"

- List of 40-50 items

Frailty Index =

- $\frac{\text{Number of deficits in an individual}}{\text{Total number of deficits measured}}$

- Example:

$$\frac{15 \text{ deficits}}{50 \text{ deficits listed/measured}} = 0.3$$

- >0.2 = Frail

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Clinical Frailty Scale*

1 Very Fit – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.

2 Well – People who have **no active disease symptoms** but are less fit than category 1. Often, they exercise or are very **active occasionally**, e.g. seasonally.

3 Managing Well – People whose **medical problems are well controlled**, but are **not regularly active** beyond routine walking.

4 Vulnerable – While **not dependent** on others for daily help, often **symptoms limit activities**. A common complaint is being “slowed up”, and/or being tired during the day.

5 Mildly Frail – These people often have **more evident slowing**, and need help in **high order IADLs** (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.

6 Moderately Frail – People need help with **all outside activities** and with **keeping house**. Inside, they often have problems with stairs and need **help with bathing** and might need minimal assistance (cuing, standby) with dressing.

7 Severely Frail – Completely dependent for **personal care**, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~ 6 months).

8 Very Severely Frail – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.

9 Terminally Ill – Approaching the end of life. This category applies to people with a **life expectancy <6 months**, who are **not otherwise evidently frail**.

Scoring frailty in people with dementia
 The degree of frailty corresponds to the degree of dementia. Common **symptoms in mild dementia** include: forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.
 In **moderate dementia**, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.
 In **severe dementia**, they cannot do personal care without help.

* 1. Canadian Study on Health & Aging, Revised 2008.
 2. K. Rockwood et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489-495.
 © 2005-2009 Version 1.2. All rights reserved. Geriatric Medicine Research, Dalhousie University, Halifax, Canada. Permission granted to copy for research and educational purposes only.

Groningen Frailty Indicator Steverink et al 2001

- 9 Physical components
- Question; Are you able to carry out these tasks single-handedly and without any help? 1. Shopping, 2. Walking around outside.....
- 3 Social components
- Example; Do other people pay attention to you?
- 3 psycho-social components
- Do you have troubles with your memory ?
- In the past 4 weeks did you feel downhearted or sad?
- In the past 4 weeks did you feel nervous or anxious?

• Total Score 0-15

• > 4 = Frail

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Frailty in PT patients (Bunt et al 2018 submitted)

- 25 Private PT practices in NL
- > 70 years
- N= 237
- → 60% is frail according to GFI

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Groningen Frailty Indicator Steverink et al 2001

- 9 Physical components
- 3 Social components
- 3 psycho-social components

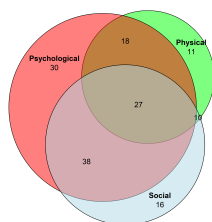
• Total Score 0-15

• > 4 = Frail

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Frailty in Physiotherapy patients

(Bunt et al 2018 submitted)



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Managing the decline

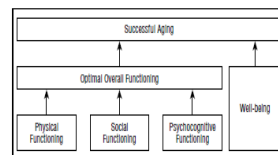


Figure 1. Quantitative model of successful aging.

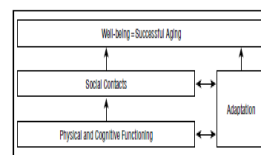


Figure 2. Qualitative model of successful aging.

Leiden Longitudinal 85+ study n=599

M von Faber, A Bootsma-van der Wiel, E van Exel, J Gussekloo, AM Lagaay, E van Dongen, DL Knook, S van der Geest, RGI Westendorp.

Successful aging in the oldest old. Who can be characterized as successfully aged? Arch Intern Med, 2001; 161:2694-2700

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conclusion

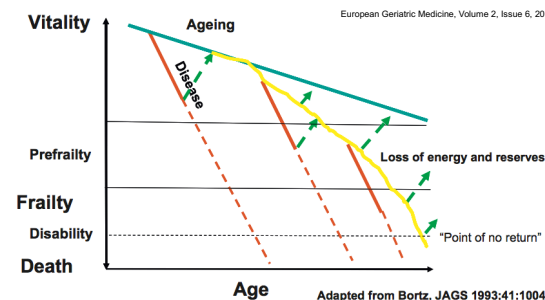
- Prevalence of Frailty is high
- Frailty is a complex phenomenon
- Frailty influences treatment and result → important to recognise multiple domains and take this into account in clinical reasoning

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T.E. Strandberg et al.

Frailty in older people

European Geriatric Medicine, Volume 2, Issue 6, 2011, 344-359



Adapted from Bortz, JAGS 1993;41:1004-8
Bortz WM. J Geront 2002;57A:M283-M288

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Thank you for your attention!

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Recent studies on this topic

- McPhee JS et al. [Physical activity in older age: perspectives for healthy ageing and frailty](#). Biogerontology. 2016 Jun;17(3):567-80
- Cesari M et al. Physical Activity Intervention to Treat the Frailty Syndrome in Older Persons—Results From the LIFE-P Study. The Journals of Gerontology Series A: Biological Sciences and Medical Sciences. 2015;70(2):216-22.
- Cameron ID et al. A multifactorial interdisciplinary intervention reduces frailty in older people: randomized trial. BMC Med. 2013;11:65.
- Pahor M et al. Effect of Structured Physical Activity on Prevention of Major Mobility Disability in Older Adults: The LIFE Study Randomized Clinical Trial. JAMA. 2014. doi:10.1001/jama.2014.5616.

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